PROCEEDINGS OF THE BIOLOGICAL SOCIETY OF WASHINGTON
113(4):1151–1161. 2000.

Metridium farcimen, the valid name of a common North Pacific sea anemone (Cnidaria: Actiniaria: Acontiaria)

Daphne Gail Fautin and Cadet Hand

(DGF) Department of Ecology and Evolutionary Biology, and KU Natural History Museum and Biodiversity Research Center, University of Kansas, Lawrence, Kansas 66045 U.S.A.; (CH) Bodega Marine Laboratory, P.O. Box 247, Bodega Bay, California 94923 U.S.A.

Abstract.—Three older names apply to the species described by Fautin et al. in 1990 as *Metridium giganteum.* They are *Actinia priapus* Tilesius, 1809, *Actinia farcimen* Brandt, 1835, and *Isometridium rickettsi* Carlgren, 1949. We synonymize these four species names. The most senior of the synonyms is a junior homonym; therefore, the valid name of this species is *Metridium farcimen* (Brandt, 1835). We also synonymize with *Metridium* the generic names *Dendractis* Andres, 1883, and *Isometridium* Carlgren, 1949.

Metridium farcimen (Fig. 1) is a conspicuous and distinctive member of the North Pacific coastal fauna. It had been considered an ecotype of *Metridium senile* (Linnaeus, 1761), characterized primarily by large size, solitary habit, and subtidal occurrence. Hand (1956:203, 204) also noted the oral disc of a small specimen is circular, whereas that of a large one is "strongly lobed," the marginal sphincter muscle may be lacking in a small specimen but is "very strongly developed" in a large one, and a small specimen may bear gonads on its perfect mesenteries "whereas larger ones never do." Carlgren (1933, 1934) and Hand (1956) documented quantitative differences in cnidae of the acontia. Nonetheless, large and small specimens were considered conspecific; taxonomic considerations centered on whether animals from the Pacific and Atlantic differ subspecifically (e.g., Hand 1956, Williams 1975) and whether the numerous Atlantic variants deserve taxonomic recognition (e.g., Stephenson 1935).

Electrophoretic differences between small, clonal, primarily intertidal specimens and large, solitary, subtidal ones (Bucklin & Hedgecock 1982) convinced us that morphological differences between animals of the two sorts are taxonomically significant. The former are clearly identifiable as *Metridium senile.* Knowing how common and conspicuous the large animals are, and how many names have been applied to morphological variants of *M. senile,* we were surprised not to find a name that unambiguously referred only to the large specimens. We therefore described a new species, *Metridium giganteum* Fautin, Bucklin, & Hand, 1990. In the course of inventorying taxonomic literature and type specimens of sea anemones (Fautin 1999: Sea anemones of the world, version 2.0. http://biocomplexity.nhm.ukans.edu/anemones/images/Version.html), DGF found three older names that refer to the species, the valid name of which is *Metridium farcimen* (Brandt, 1835).

We provide below the formal synonymy of *M. farcimen.* The conflation of *M. farcimen* with *M. senile* has been so great that we do not include the name *M. senile* in the list of synonyms—as occasion arises, scientists may find it useful to identify particular instances of reference to *M. farcimen* under the name *M. senile.*

Metridium farcimen (Brandt, 1835)

non *Actinia Priapus Forsk.:* Gmelin, 1788:3134

Actinia Priapus Telesius, 1809:405

Actinia farcimen Brandt, 1835:12

Fig. 1. *Metridium farcimen* (Brandt, 1835) drawn by Steven Sechovec from life.

non *Actinia priapus,* Gmelin: Milne Edwards, 1857:280
L'Actinia farcimen, Brandt: Milne Edwards, 1857:289
Heliactis farcimen Brandt: Andres, 1883: 181
Dendractis priapus Til.: Andres, 1883: 364
Isometridium Richettsi Carlgren, 1949: 106

Isometridium rickettsi Carlgren, 1951: 430
Metridium giganteum Fautin, Bucklin, & Hand, 1990:81

History of Names Applied to This Species

The diagnosis of *Actinia priapus* ("*Actiniae Kamtschaticae descriptio*"), on page 405 of a long publication by Tilesius (1809) concerned with sea anemone taxonomy, is as follows:

> [penis equi ab incolis littoralibus ad Kamtschatkam dicta:) *A. maxima longissima cylindracea, badia vel fusca, transversim rugosa, basi affixa dilatata, labata; extremitate libera glandiformi praeputio tecta, disco ramoso tentaculifero albido, tentaculis papillaeformibus numerosissimis fasciculosis. Ore centrali prominulo, cum disco retractili.* (Rendered originally in italics.]
>
> Translation: (called horse penis by the coastal inhabitants of Kamtschatka:) Extremely long and cylindrical, bay or dark colored, wrinkled transversely, with affixed base dilated, lobed [?: probably a misprint for *lobata,* which means lobed; the other possibility is "lipped," the correct rendering of which would be *labiata*]; free extremity glandiform, covered with foreskin, branched disc with whitish tentacles, very numerous papilliform tentacles in small bundles. Mouth central, somewhat prominent, with retractile disc.

Brandt's (1835:12) description of "Actinia (*Polystephanus, Entacmaea*) *farcimen*" was based on notes made by Mertens. We reproduce the description in its entirety.

> Corpus fere pedale, admodum elongatum, cylindricum a basi usque supra medium e flavo brunneum lineis e rufo fuscis notatum, parte superiore album. Tentacula alba numerosissima, teretia, conico-filiformia, valde acuminata et attenuata, interiora exterioribus minimis multo quidem longiora, sed disci margine lobati latitudine duplo vel plus breviora.
>
> In sinu Awatschaënsi peninsulae Camtschatkae.
>
> Translation: Body nearly a foot long, completely elongated, cylindrical from the base up to above the middle [where it is] golden brown with fine dark red lines, upper part pale. Tentacles very numerous, white, slender, conico-filiform, exceedingly short and pointed, interior ones much longer than the small exterior ones, but with the disc margin lobate [and] the broad diameter at least twice the shorter.
>
> In Avacha Bay of the Kamchatka peninsula.

In 1940, Ricketts and Steinbeck collected a single specimen listed in Carlgren's (1951) treatment of the fauna of the Gulf of California as *Isometridium rickettsi,* new genus and new species (Fig. 2). However, Carlgren had included the name in his 1949 catalog to sea anemones of the world, rendered "richettsi." Williams (1997) interpreted that spelling as an error, an opinion with which we agree, given that, in the paper ostensibly describing the species, the name was rendered "rickettsi" and Carlgren (1951:415) noted the specimen was collected "by E. F. Ricketts." The catalog diagnosis of the genus (reproduced below and differing in only minor ways from that of 1951) differentiated the taxon and thereby made the name available under the provisions of Article 13.1.1 of the International Code of Zoological Nomenclature (ICZN) (International Commission on Zoological Nomenclature 1999). The sole detail Carlgren provided in 1949 (page 106) for the species is its provenance—"Guayamas [sic] [Sonora], Mexico." We regard that item, combined with the fact the genus contained only a single species, sufficient to differentiate the species. Therefore, genus and species date from 1949, as pointed out by Williams (1997).

> Metridiidae ? with broad base. Column divisible into a smooth very thick scapus and a thinner capitulum, the former ends above in a distinct collar. No cinclides. Sphincter mesogloeal in the capitulum and in the uppermost part of the scapus. Uppermost part of capitulum and the oral disc drawn out in very numerous permanent lobes. At the apices of these lobes there are extraordinarily numerous, short, filiform tentacles of about same length, their longitudinal muscles ectodermal. Oral disc forming a fold inside the tentacles. Radial muscles well developed, ectodermal on the outer side of the fold and on the inner side of the lobes (in a groove), seemingly absent in other parts. 2 very broad siphonoglyphs. Mesenteries very numerous. Several perfect pairs of mesenteries. The 12 first pairs sterile. Retractors of the mesenteries diffuse, weak. Acontia numerous. Cnidom: spirocysts, basitrichs, microbasic *p*-mastigophors, microbasic amastigophors (and microbasic *b*-mastigophors ?).
>
> The systematic position of this genus is doubtful.

Fig. 2. Original photo of holotype of *Isometridium rickettsi* (specimen 49458 in the Division of Invertebrate Zoology, National Museum of Natural History): at left, oral half and original label; at right, entire specimen.

The nematocysts of the acontia were unexploded so that it was very difficult to clear up their types.

Gmelin (1788) used the name *Actinia priapus* as a replacement name for Forskål's (1775) species *Priapus polypus.* In 1857, Milne Edwards' only use of the name *Actinia priapus* was in the sense of Gmelin; he omitted Tilesius' (1809) species from his scheme, and listed "L'Actinia farcimen" among species too poorly known to assign a place. In the only comprehensive treatment of sea anemone taxonomy to have been published until now, Andres (1883) placed Tilesius' species in a new monotypic genus, *Dendractis,* of uncertain affinity. His generic name recognized the "forma arborescente delle appendici discali" (page 365). Andres (1883:181) listed *Actinia farcimen* as *Heliactis farcimen* under the heading "Sagartidae dubiae." He regarded *Actinia priapus* sensu Gmelin as one of many junior synonyms of *Adamsia rondeletti* Delle Chiaje, 1825.

The names *Actinia priapus* (in the sense of Telesius) and *A. farcimen* seem mostly to have been ignored during the 20th century. The publications of Tilesius and Brandt were not mentioned in Stephenson's (1920, 1921, 1922) "Classification of Actiniaria." Although Carlgren referred to *Actinia priapus* in a 1933 publication (see below), he did not include the species in his 1949 catalog to sea anemones of the world. However, the catalog does contain at least two of Brandt's species, *Actinia xanthogrammica* and *Actinia elegantissima,* the former in the genus *Anthopleura,* the latter questionably in the genus *Bunodactis* (both are now placed in *Anthopleura* [e.g., Hand 1955]). Descriptions of other of Brandt's species are also sufficiently diagnostic to be identifiable: DGF (writing as Dunn 1981) resuscitated the name *Stichodactyla mertensii.*

Hand (1956) mentioned *Isometridium ricketsi* [sic] but considered that insufficient information about it was available for meaningful discussion.

Thus, the oldest synonym for this species, *Actinia priapus* Telesius, 1809, is, itself, a junior homonym. Therefore, the valid name of this species is *Metridium farcimen* (Brandt, 1835). We consider substitution of this name not to be disruptive to usage and therefore not in violation of Article 23.2 of the ICZN (International Commission on Zoological Nomenclature, 1999). The only names having wide recent

usage for the species are properly applied to another species, *M. senile.* The name *M. giganteum* has only begun to be included in field guides (e.g., Gotshall 1994, Harbo 1999). Because such usages are few, this seems an ideal time to correct our error.

Taxonomic Considerations

Tilesius (1809), Brandt (1835), and Carlgren (1949) all noted the extremely numerous short tentacles and lobed oral disc of the species we (Fautin et al. 1990) named *M. giganteum.* Tilesius (1809) remarked on the animal's characteristic great size but provided no data other than stating the accompanying figure was life size. In our photocopied plate (Fig. 3), the length of the largest specimen is about 110 mm and the basal diameter is 65 mm; according to Andres (1883:365), "Grandi Colonna lunghezza fino a 0^{m},15 e 0^{m},20; larghezza fino a 0^{m},7." Possibly the photocopy, which is the only version of the figure we were able to procure, has been reduced, perhaps the subject of the figure was contracted in length, or perhaps an animal 110 mm long was large in Telesius' experience. In any case, there is no doubt that Plate XIV of Tilesius (1809) illustrates four specimens of the species in question, the largest moderately expanded and three each with only a tuft of tentacles visible. The image is also available electronically as part of the coverage of *Actinia priapus* in Fautin (1999: Sea anemones of the world, version 2.0. http://biocomplexity.nhm.ukans.edu/anemones/images/Version.html). Tilesius (1809) returned the specimens of *A. priapus* he studied to the sea, so no type specimens of it exist. Brandt (1835), whose description was not illustrated, also remarked on the animal's large size, giving the length as nearly a foot (ca. 300 mm). To the best of our knowledge, there are no type specimens of *A. farcimen* (see Fautin 1999: Sea anemones of the world, version 2.0. http://biocomplexity.nhm.ukans.edu/anemones/images/Version.html).

The type locality of both species is Avacha Bay (Avachinskaya Guba) (52°30′N, 52°E). Harbors and embayments are typical habitats of the species in question. Carlgren (1934) reported specimens of "*Metridium senile* var. *fimbriatum*" had been collected in Awatcha Bay by the Swedish Kamchatka Expedition in 1921 (he also noted specimens from elsewhere in Kamchatka and from Alaska). DGF examined the five specimens bearing Swedish Natural History Museum catalog number 18350 (old number 995) that are accompanied by labels in Carlgren's hand "Petropavlovsk/Kamtchatka/May 1921/Sw Kamtchatka Exp." and "Metridium senile var. fimbriatum determ. Carlgren." One specimen is depicted in Fig. 4. The specimens agree in all particulars with the species we (Fautin et al. 1990) named *M. giganteum.* The existence of that species in the type locality of *A. priapus* and *A. farcimen* supports our assertion that the names are synonymous.

DGF examined the holotype of *Isometridium rickettsi,* specimen 49458 in the Division of Invertebrate Zoology of the National Museum of Natural History, Smithsonian Institution. It is the subject of Fig. 2; the photograph of it in Carlgren (1951) is small and lacks contrast. It is strongly contracted although the highly lobed oral disc—which is covered by many short tentacles—is exposed. The diameter of its pedal disc is 105 mm, its diameter at mid-column is 70 × 85 mm, and it is about 100 mm long (it is asymmetrically contracted so its minimum length is about 90 mm and its maximum about 110 mm). Externally, its column differs in two particulars from that of most specimens of *Metridium farcimen* with which we are familiar—it is wrinkled, and it is not a solid color. With regard to the latter feature, in his discussion of *M. dianthus,* which appears to refer to both large and small specimens, Torrey (1902: 395) remarked ". . . that white and salmon polyps may exhibit blotches of brown . . . ," and Tilesius (1809) and Brandt (1835) also referred to dark striations on the light col-

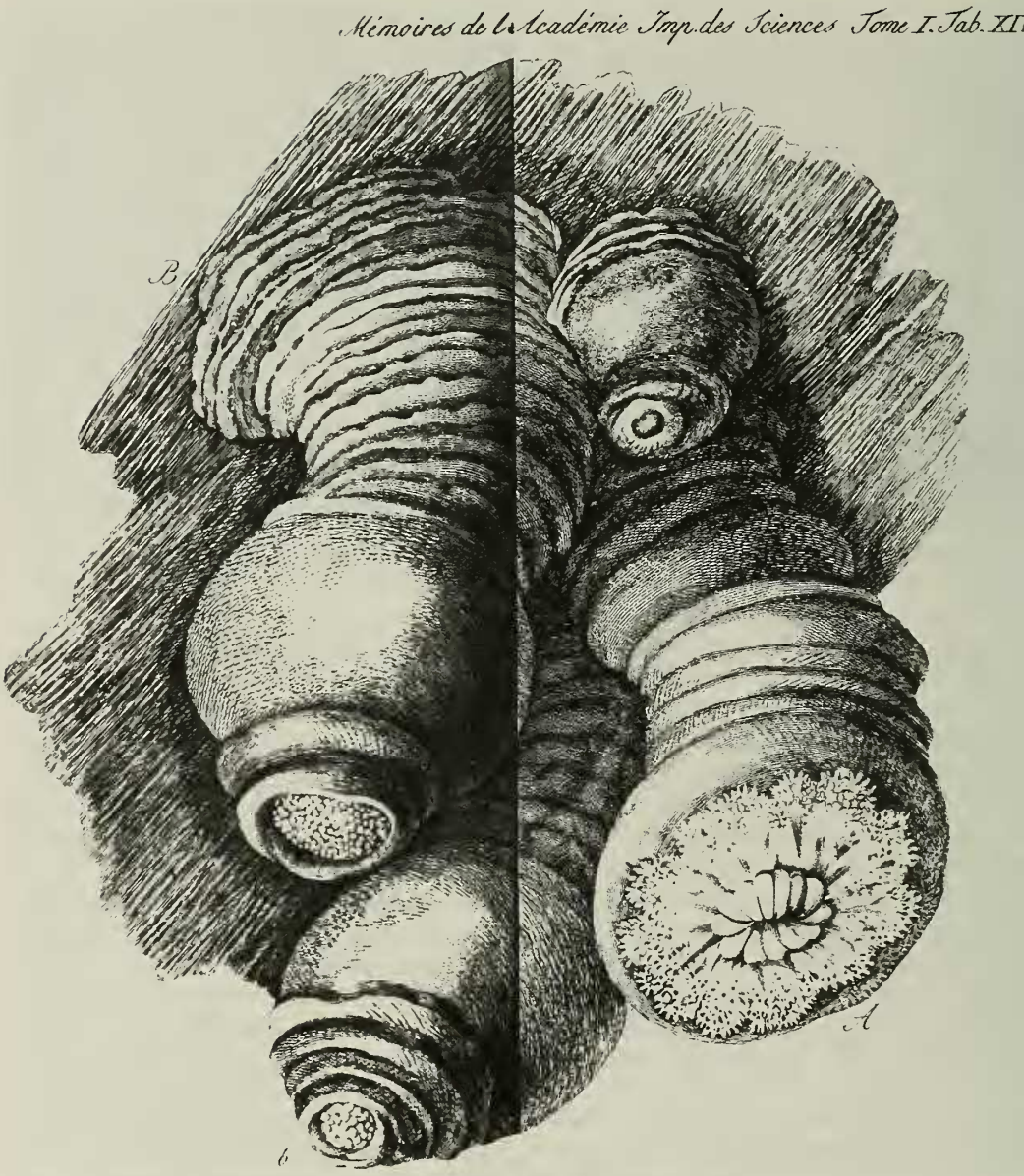

Fig. 3. *Actinia priapus:* Plate XIV from the description of Tilesius (1809).

umn. The wrinkling is probably due to contraction, which could be a result of the animal's having been trawled from considerable depth in a net with many other animals. The individuals illustrated by Telesius (Fig. 3) are wrinkled, too. Contraction could also produce great column thickness.

In his "description" of *Isometridium,* Carlgren (1951:431) remarked "The appearance of this very interesting type resembles that of *Metridium,* but its organization is quite different from that of this genus." However, the only difference he explicitly stated is that "the tentacles [are] thin and delicate and extraordinarily numerous, certainly more numerous than those of *Metridium*" (page 432). A point-by-point comparison of Carlgren's (1949)

Fig. 4. One of five specimens collected on the 1921 Swedish Kamchatka Expedition (Swedish Natural History Museum 18350 [old catalog number 995]).

diagnoses of *Isometridium* and *Metridium* reveals few other differences: *Isometridium* bears 12 pairs of sterile mesenteries and no cinclides, whereas *Metridium* has cinclides, and mesenteries of the first 6 pairs are sterile in "typical individuals." Carlgren (1949, 1951) remarked on the marginal sphincter muscle extending into the capitulum of *Isometridium,* but did not comment on its state in *Metridium.*

These differences are in variable characters we consider to distinguish species,

not genera. Thus Carlgren's comparison was really between *Metridium farcimen* and the better-known *M. senile,* which occurs in Europe (as well as both coasts of North America) and with which, therefore, Carlgren presumably was more familiar. The vast number of tentacles was noted by both Telesius (1809) and Brandt (1835). In his treatment of "*M. senile,*" Hand (1956:194) noted that a "sphincter is present at the top of the scapus in most specimens; this may be absent or very weak in small specimens." It is not unreasonable, by extension, to expect the muscle to be more extensively developed in larger specimens. Hand also noted the pattern of sterile mesenteries may differ between "younger" and "older" specimens—possibly the difference actually had to do with species, but because this character does appear to be variable, it is not suitable for distinguishing genera. Hand remarked the cinclides could be inconspicuous; thus, their apparent absence in a single contracted specimen should not be used as the basis of a new genus.

The resemblance of animals now placed in the genus *Metridium* to a mammalian penis is manifest in Linnaeus' original generic name of anemones, *Priapus* (see Opinion 1295 of the International Commission on Zoological Nomenclature), as well as Tilesius' name and that given to the animals by the people of Kamchatka.

Geographic Distribution

We (Fautin et al. 1990:81) gave the geographical range of *M. giganteum* as "From Alexander Archipelago, Alaska (56–58°N) (or further north) south along Pacific coast of North America through California." We have confirmed the specimens Carlgren (1934) referred to as *M. s. fimbriatum* from Kamchatka belong to the species in question (e.g., that depicted in Fig. 4); Carlgren (1934, 1936) also examined specimens he referred to that taxon from the Aleutians and Norton Sound, and Sitka, respectively. Therefore, the species certainly ranges at least from the tip of Kamchatka through the Aleutian Islands and down the west coast of Canada and the United States to San Diego. Gotshall (1994:29) wrote that the "White-plumed Anemone *Metridium giganteum*" ranges from "Alaska to Santa Catalina Island, California." Carlgren (1933) considered *M. senile* to be a low boreal form, and not to range into truly Arctic waters.

The occurrence of *M. farcimen* in the Gulf of California is surprising. A distinctive species, it is not included in guides to the shallow water of that region (e.g., Brusca 1973, Kerstitch 1989). The specimen label for the holotype of *Isometridium rickettsi* provides no details about provenance other than Guaymas. However, Chapter 27 of the log of the expedition (Steinbeck & Ricketts 1941, Steinbeck 1951) recounts that on 9 April 1940, "about an hour" after leaving Guaymas, at which no collecting was reported to have been done, the expedition encountered a Japanese fishing fleet. Members of the expedition, Steinbeck and Ricketts among them, were permitted to pick out specimens from the dredge-haul of one of the boats. This was undoubtedly the source of the specimen. Although the only information in the log that might refer to the specimen is the sentence "And there were bottom-samples with anemones and grass-like gorgonians," the date of collection on the museum label (Fig. 2) and in Carlgren (1951) is 9 April 1940.

Few reports specify the depth at which the animals live. In our description of *M. giganteum,* we (Fautin et al. 1990) gave the bathymetric range as intertidal to at least 256 m (collecting depth of the deepest paratype). The Sea of Cortez slopes steeply to a depth of nearly 2000 m west of Guaymas, but the holotype of *I. rickettsi* was collected a short distance south of that city. Trawling in 1940 is unlikely to have been done much deeper than 200 m (Les Watling, pers. comm.), a depth achieved not far from Guaymas. We infer that the upper depth limit declines with latitude, and provides

another example of tropical submergence (Sverdrup et al. 1946). Clearly this species extends further south than had been thought, but presumably only at depths that have not been well studied. It may range much further south than is currently documented.

Nomenclatural Considerations

The generic name *Dendractis* was created by Andres (1883) for Telesius' species *Actinia priapus,* possibly in recognition of the homonymy of *A. priapus* and the distinctiveness of the animal. Therefore, *Dendractis* is a subjective junior synonym of *Metridium.* The name *Metridium* was, itself, proposed by Oken (1815) for the Linnaean species *Actinia senilis.* It was among Oken's names that were declared invalid by Opinion 417 of the International Commission on Zoological Nomenclature. In Opinion 1269, which responded to a request by Dunn & Hulsemann (1979), the Commission ruled that de Blainville 1824, is the author of *Metridium.*

Although the name *M. senile* has been used to refer to both *M. senile* sensu stricto and *M. farcimen* in the North Pacific, there was some effort to distinguish them. Carlgren (1933:23) was of the opinion that a large specimen from Nanaimo (British Columbia) he had examined differed from what he referred to as *M. dianthus.* The name *M. s. fimbriatum* or *M. fimbriatum* was most consistently used for *M. farcimen,* as, for example, by Carlgren (1934, 1936). [In 1936 (page 23), Carlgren wrote (I take the opportunity to rectify a lapsus in my paper *Some Actiniaria [sic] from Bering Sea and arctic waters* (1934, p. 353). Where I have written "var. *marginatum*" read "var. *fimbriatum.*")] However, Hand (1956:203), for example, did not maintain such a distinction, considering *M. s. fimbriatum* to be "*Metridium senile* as it occurs in the Pacific Ocean." He (Hand 1957) deposited two lots of topotypes of *M. s. fimbriatum* in the National Museum of Natural History, Smithsonian Institution. The four specimens bearing catalog number 50641 appear to be missing; that bearing number 50640 (depicted in Hand 1956:243) was erroneously cataloged as a neotype. Despite Hand's (1957) assertion, two syntypes of *Metridium fimbriatum* Verrill, 1865, exist in the collection of the Yale Peabody Museum (catalog number 9494; Fautin 1999: Sea anemones of the world, version 2.0. http://biocomplexity.nhm.ukans.edu/anemones/images/Version.html). The smaller (about 12 mm length and diameter) resembles *M. senile* sensu stricto whereas the larger (about 80 mm long and 30 mm diameter) resembles *M. farcimen* (DGF, pers. obs.). Because of such ambiguities, we (Fautin et al. 1990) coined an entirely new name for the species.

Carlgren (1933:23) further speculated that Tilesius' *Actinia priapus* and a specimen from Nemuro, Hokkaido, identified by Wassilieff (1908) as *M. dianthus* "may possibly be identical with *M. fimbriatum* which has been found in several localities between Alaska and San Francisco." Its irregular internal anatomy makes the specimen examined by Wassilieff (1908) likely to have been a specimen of *M. senile,* which can reproduce asexually, a process that can lead to such asymmetry (e.g., Hand 1956, writing in reference to the anemone *Haliplanella luciae,* and Dunn 1981, writing of *Entacmaea quadricolor*).

In light of the broad geographical range of *M. farcimen* and the variability of *M. senile,* both morphological (e.g., Torrey 1902; Carlgren 1933, 1936; Hand 1956) and molecular (Bucklin & Hedgecock 1982), we are concerned that the new species *M. sinensis* and *M. huanghaiensis* described by Pei (1998) may be unwarranted. Color drawings of them (plate I, fig. 3 and 4, respectively) resemble *M. senile.* The animal depicted in Plate I, fig. 2, a color drawing labeled *Metridium senile fimbriatum* (but referred to in the table of contents and some places in the text as *Metridium sensile*) appears to be *M. farcimen.*

Acknowledgments

We are extremely grateful to Ann Bucklin for her contributions to and encouragement of this research. We also thank Shawn Arellano, Stephen D. Cairns, J. C. den Hartog, Karin Sindemark, and Valerie Cappola. Comments by Ray Williams on an earlier version of this manuscript greatly improved it. Supported by NSF grant DEB 9521819 (PEET) to DGF.

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